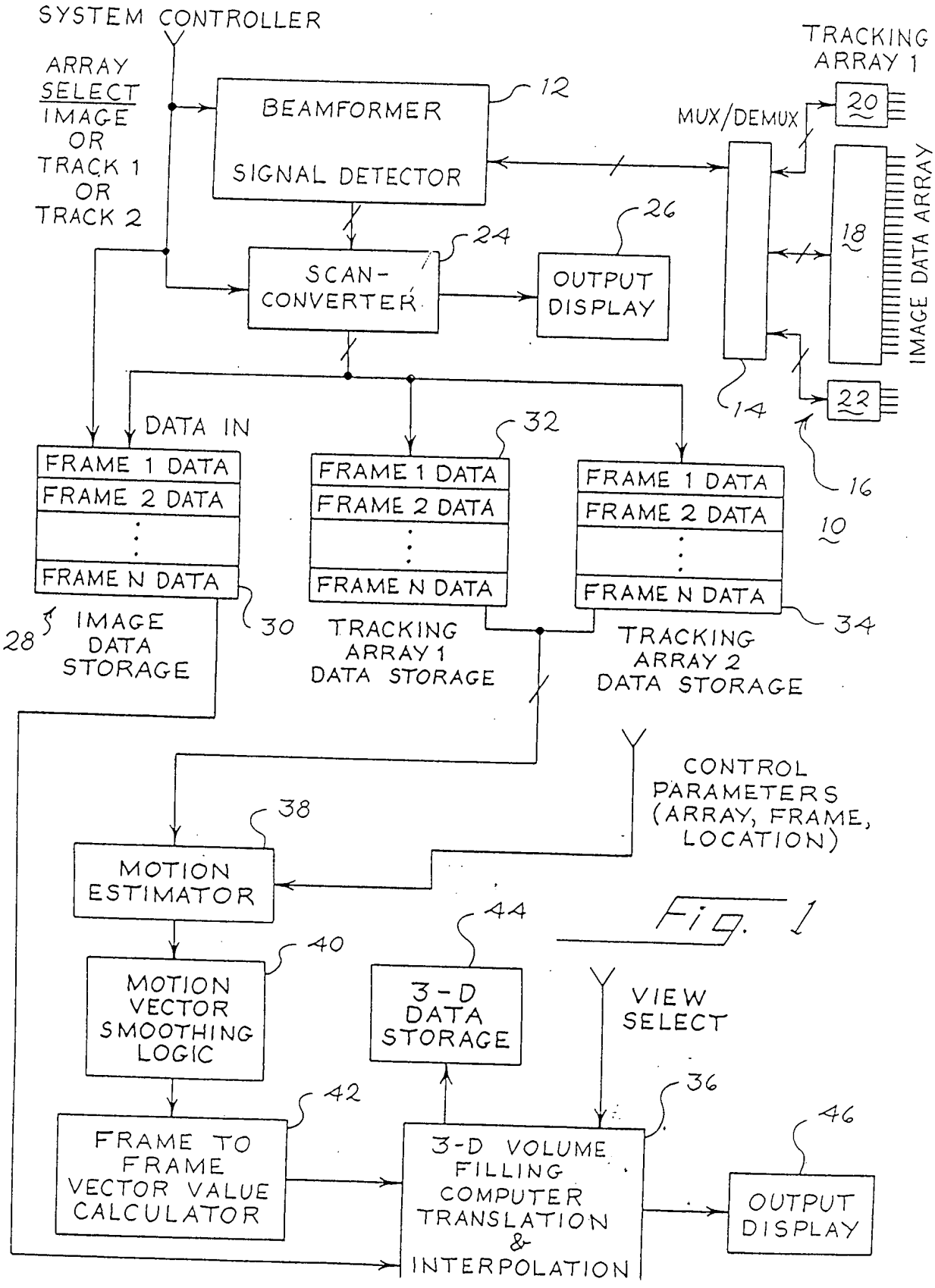

SYSTEM CONTROLLER
ARRAY SELECT IMAGE OR TRACK 1 OR TRACK 2
BEAMFORMER
SIGNAL DETECTOR
12
TRACKING ARRAY 1
MUX/DEMUX
20
18
IMAGE DATA ARRAY
22
14
16
10
SCAN-CONVERTER
24
OUTPUT DISPLAY
26
DATA IN
FRAME 1 DATA
FRAME 2 DATA
FRAME N DATA
28
IMAGE DATA STORAGE
30
32
TRACKING ARRAY 1 DATA STORAGE
34
TRACKING ARRAY 2 DATA STORAGE
CONTROL PARAMETERS (ARRAY, FRAME, LOCATION)
38
MOTION ESTIMATOR
40
MOTION VECTOR SMOOTHING LOGIC
42
FRAME TO FRAME VECTOR VALUE CALCULATOR
44
3-D DATA STORAGE
VIEW SELECT
36
3-D VOLUME FILLING COMPUTER TRANSLATION & INTERPOLATION
46
OUTPUT DISPLAY

Fig. 1

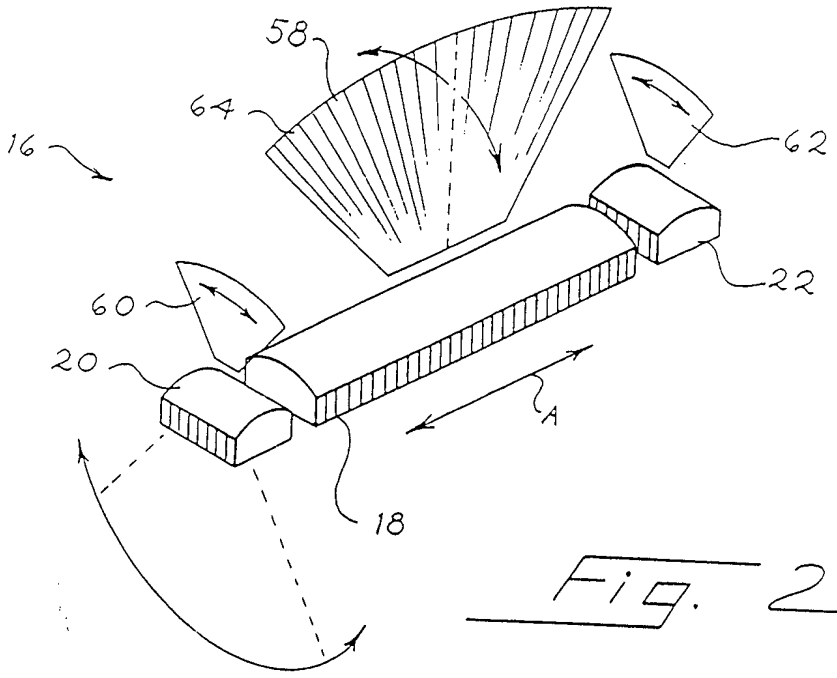


Fig. 2

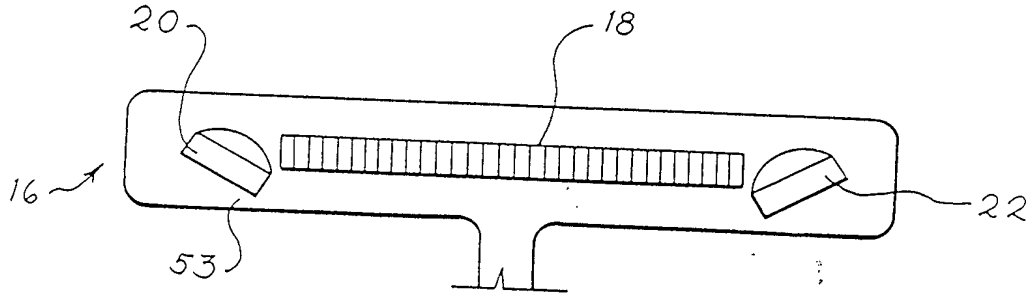


Fig. 3

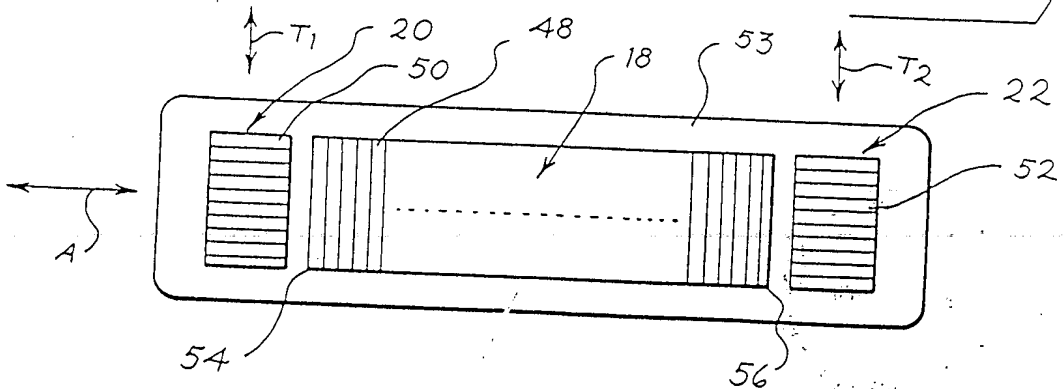


Fig. 4

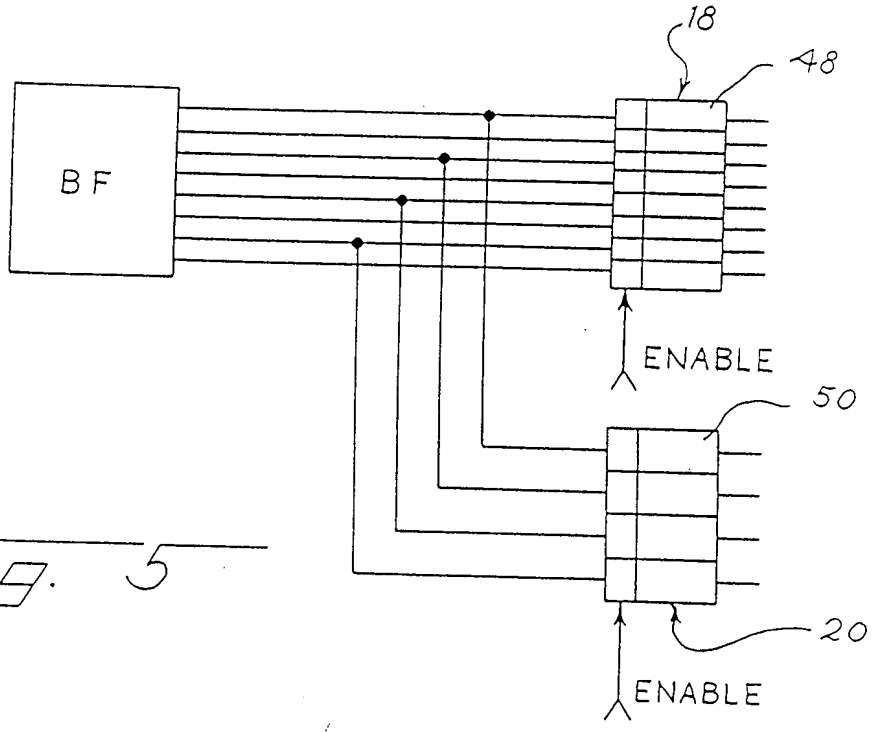

18
48
BF
ENABLE
50
20
ENABLE

Fig. 5

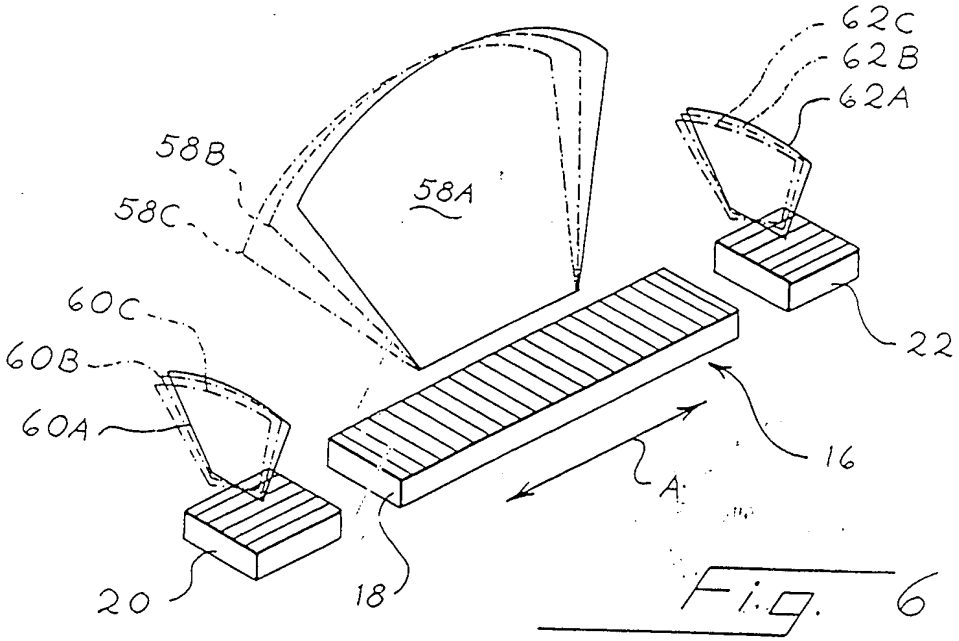

62C
62B
62A
58B
58A
58C
60C
60B
60A
22
16
A
20
18

Fig. 6

Fig. 7

Fig. 8

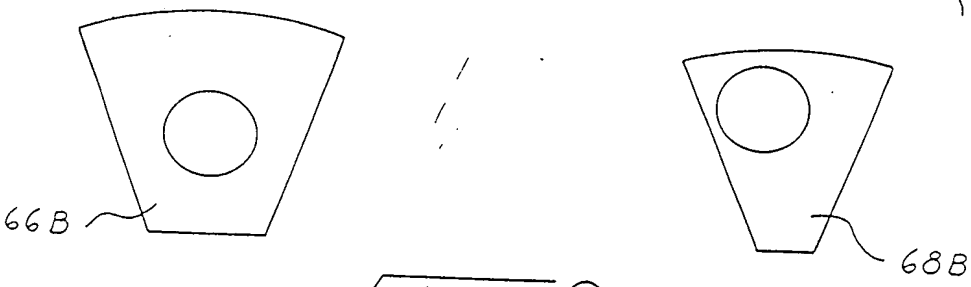


Fig. 9

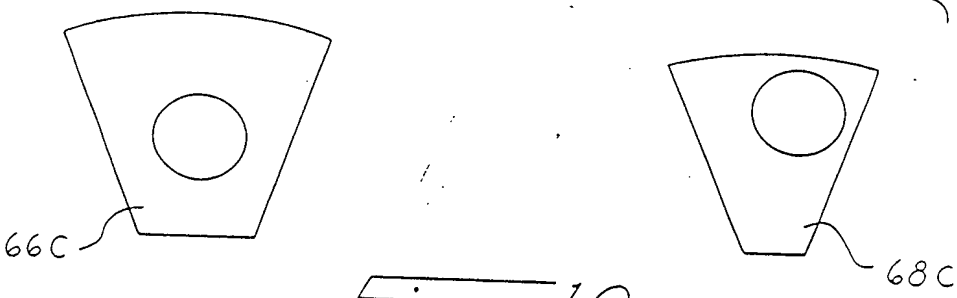


Fig. 10

Fig. 11

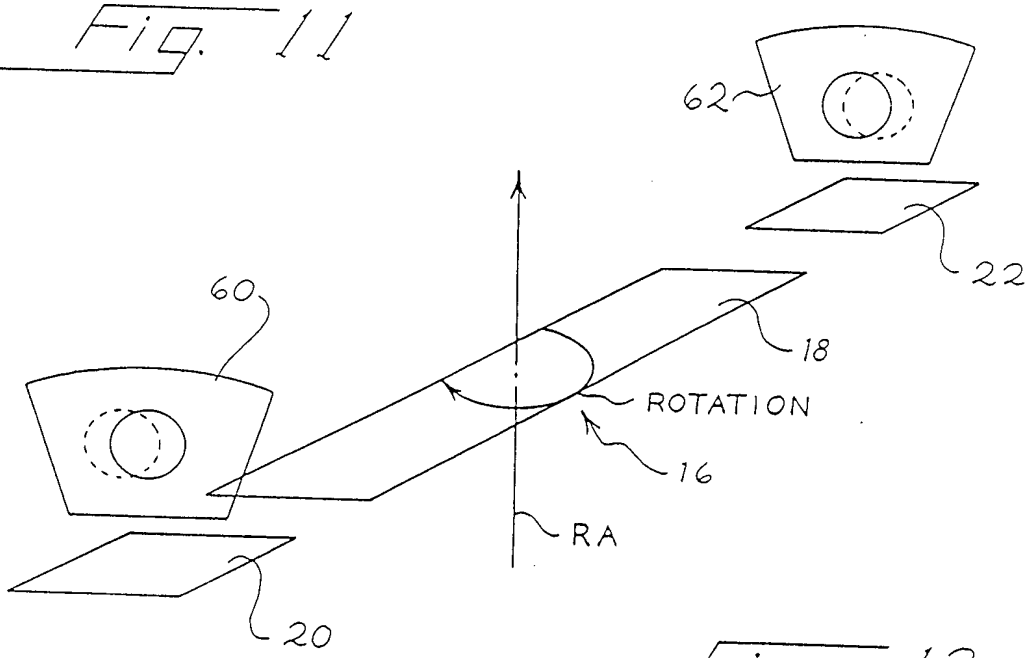
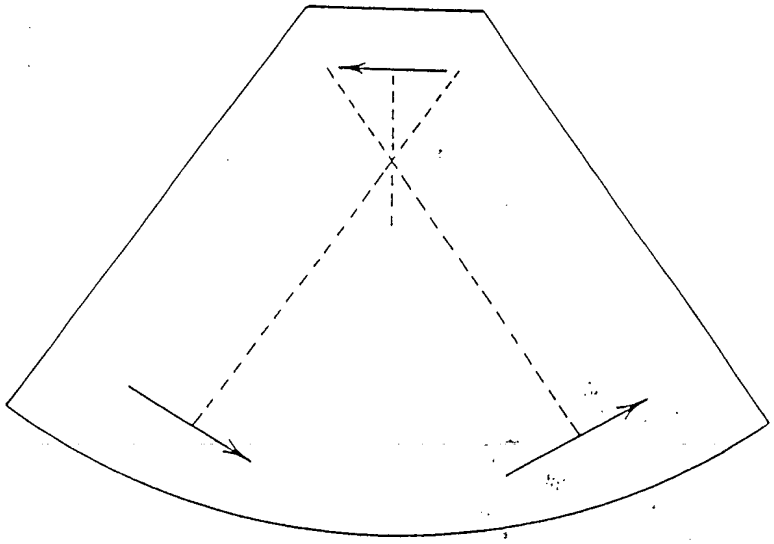


Fig. 12



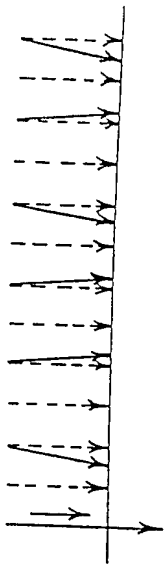


Fig. 13

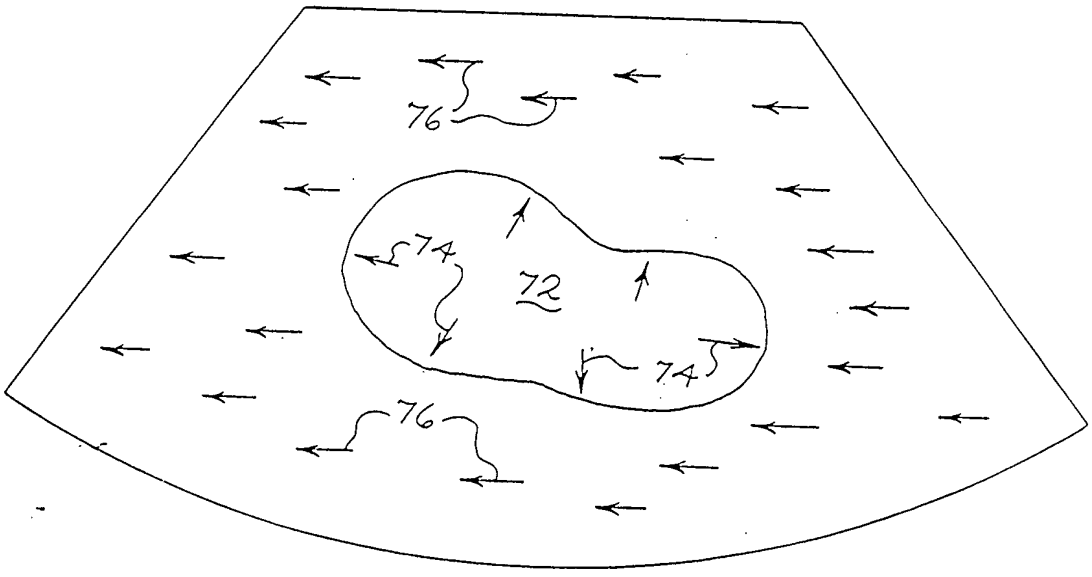


Fig. 14

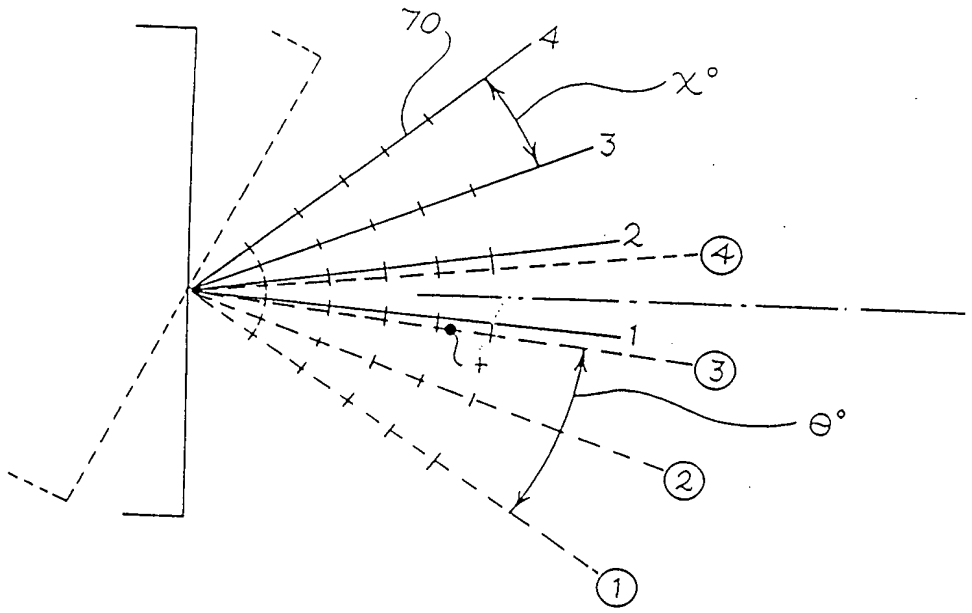


Fig. 15

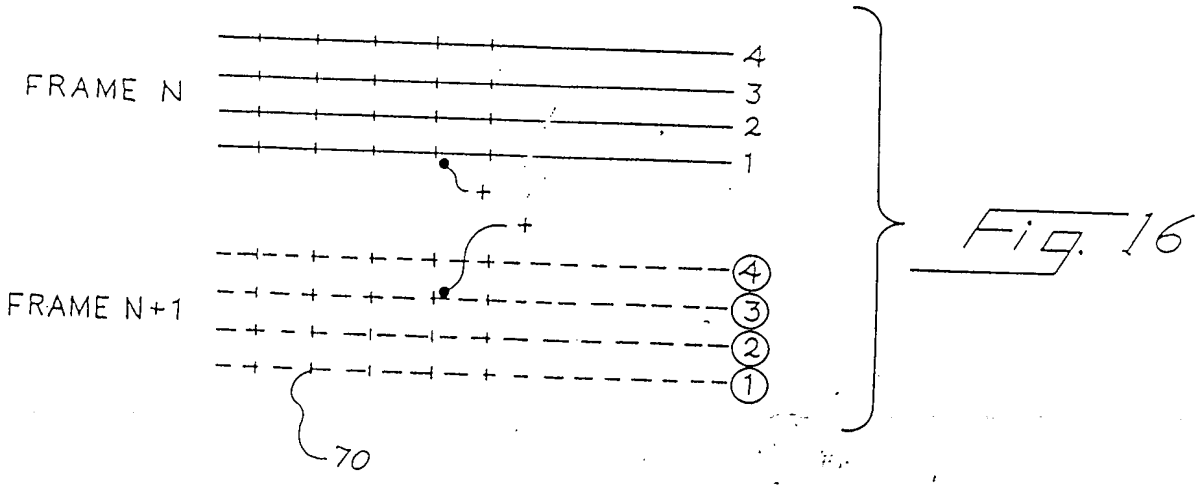


Fig. 16

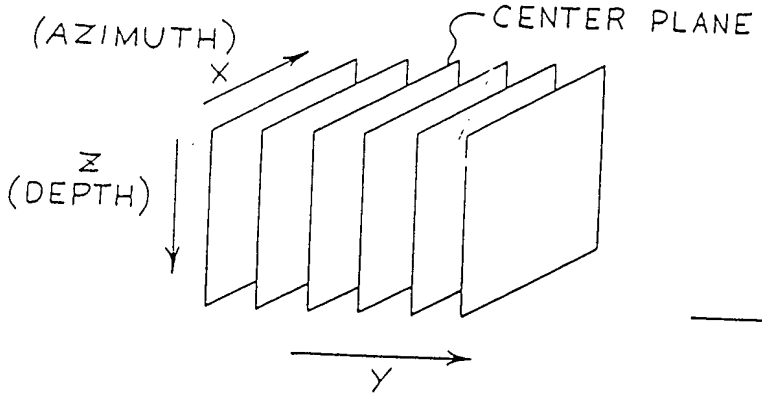


Fig. 17

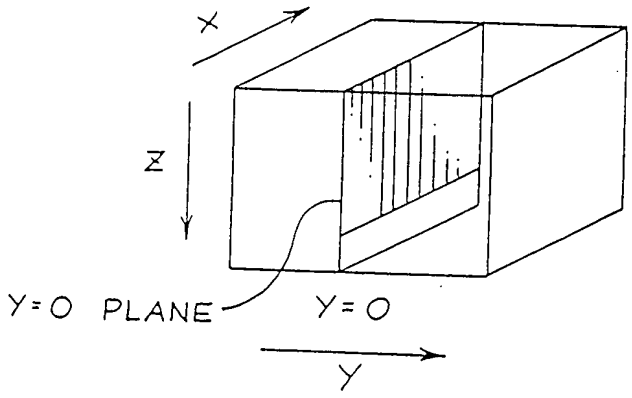


Fig. 18

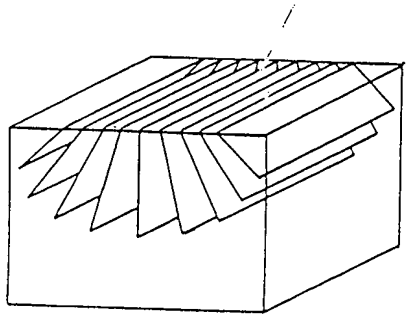


Fig. 19

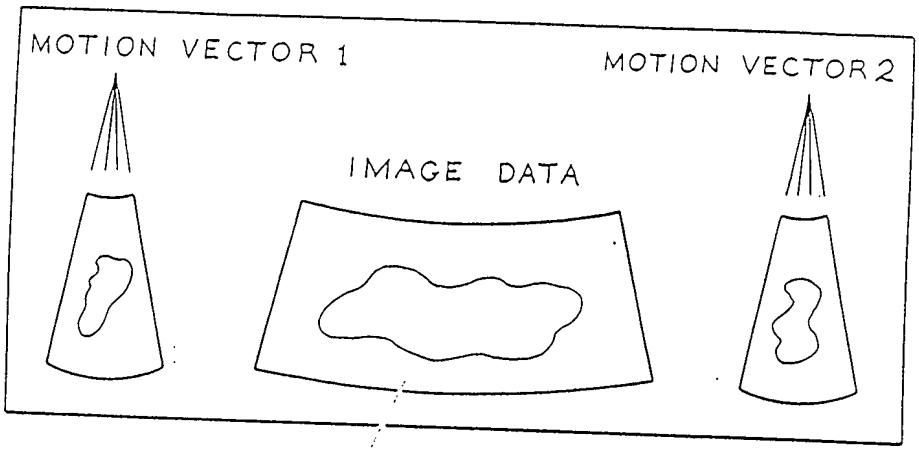


Fig. 20

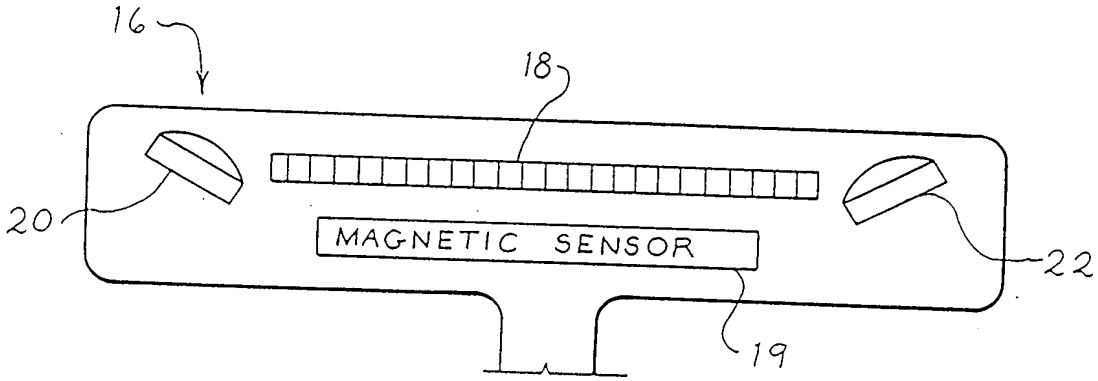


Fig. 21

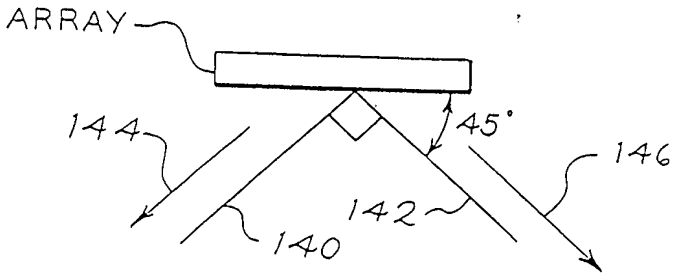
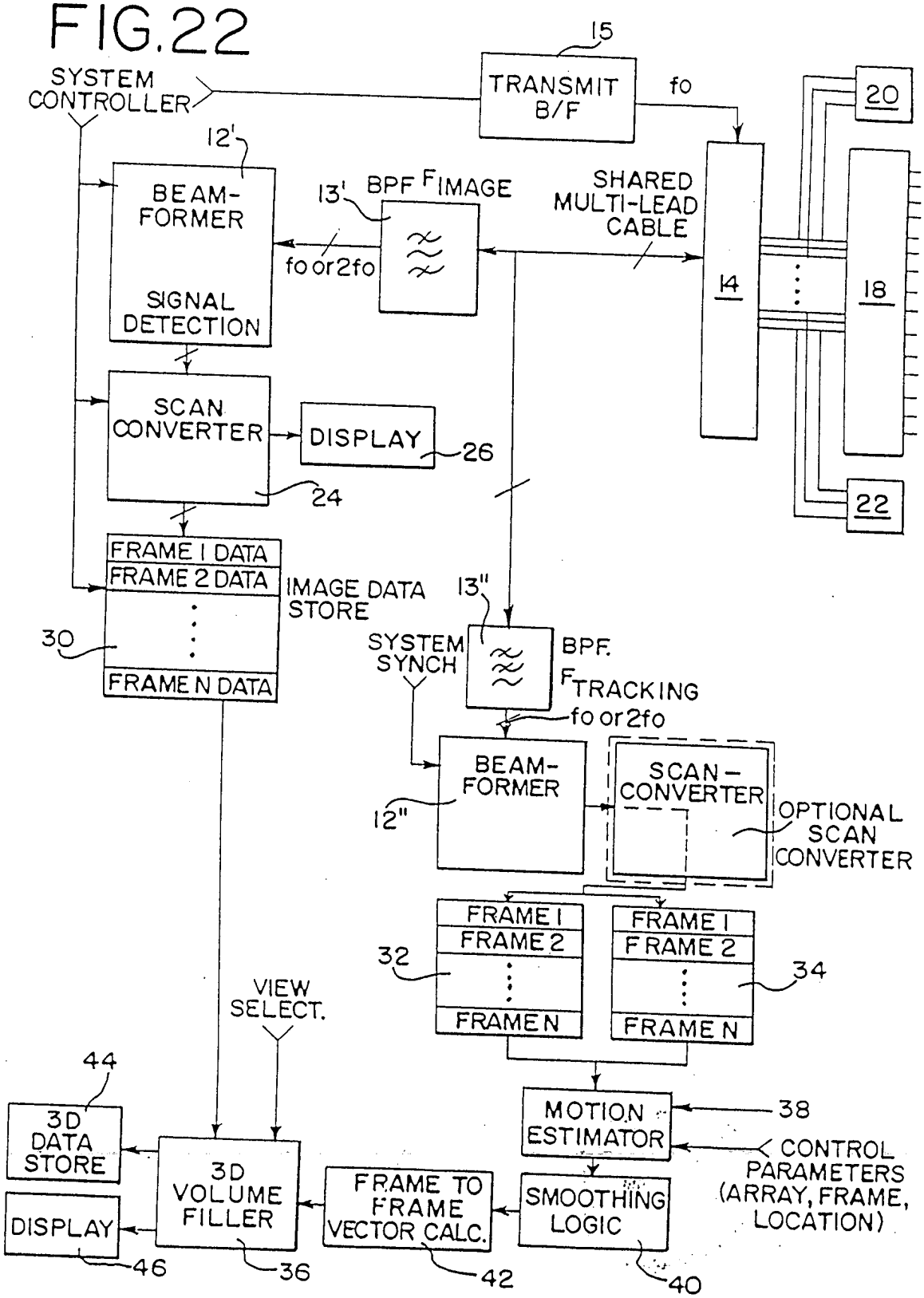


Fig. 33

FIG.22


15
TRANSMIT B/F
fo
SYSTEM CONTROLLER
20
12'
BEAM-FORMER
SIGNAL DETECTION
13'
BPF F_{IMAGE}
fo or 2fo
SHARED MULTI-LEAD CABLE
14
18
SCAN CONVERTER
DISPLAY
26
24
22
FRAME 1 DATA
FRAME 2 DATA
FRAME N DATA
IMAGE DATA STORE
30
13"
SYSTEM SYNCH
BPF. $F_{TRACKING}$
fo or 2fo
BEAM-FORMER
12"
SCAN-CONVERTER
OPTIONAL SCAN CONVERTER
FRAME 1
FRAME 2
FRAME N
32
34
VIEW SELECT.
44
3D DATA STORE
3D VOLUME FILLER
DISPLAY
46
36
FRAME TO FRAME VECTOR CALC.
42
SMOOTHING LOGIC
40
MOTION ESTIMATOR
38
CONTROL PARAMETERS (ARRAY, FRAME, LOCATION)

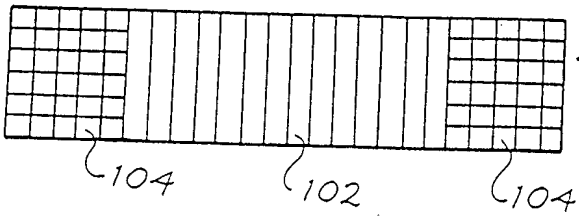


Fig. 23

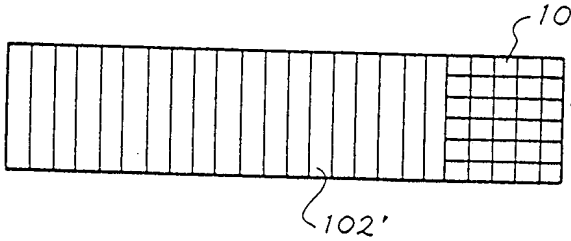


Fig. 24

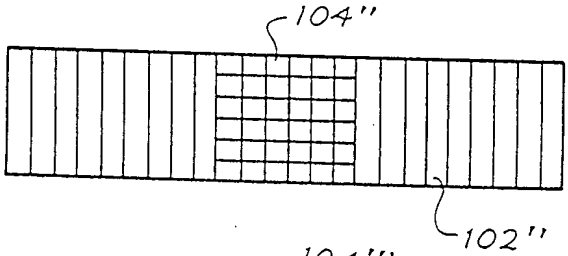


Fig. 25

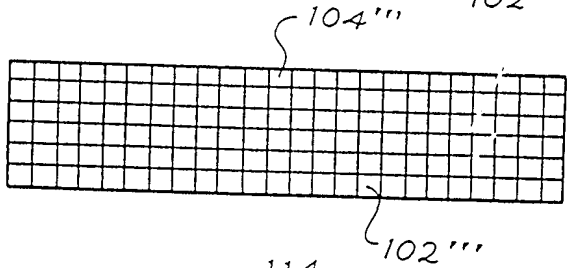


Fig. 26

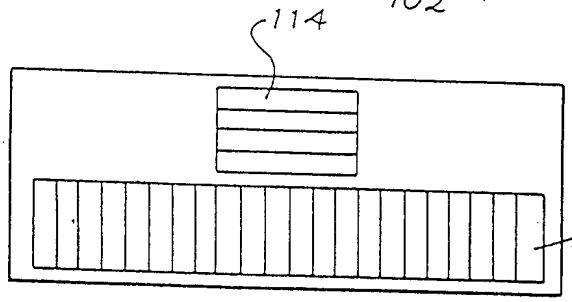


Fig. 27

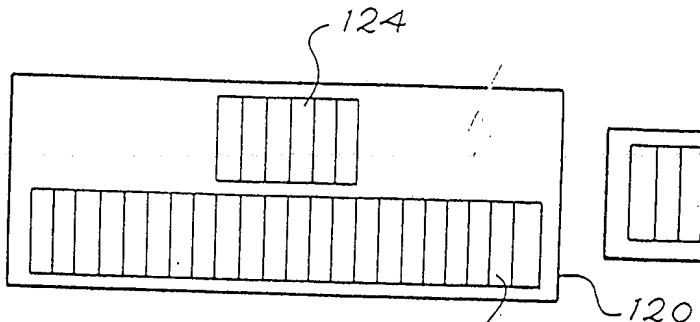


Fig. 28

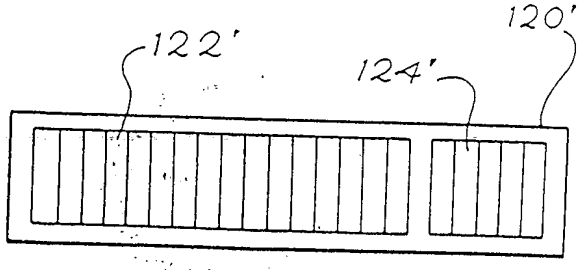


Fig. 29

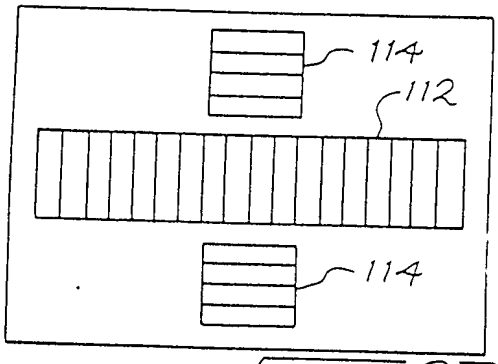


Fig. 27a

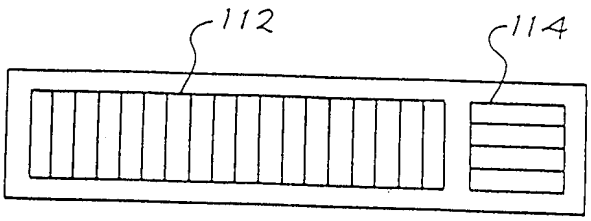


Fig. 27b

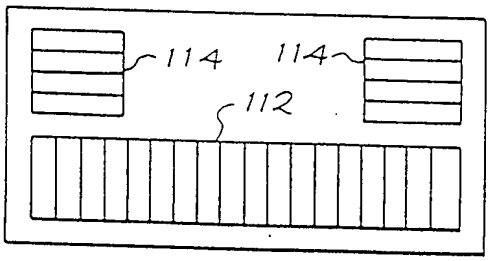


Fig. 27c

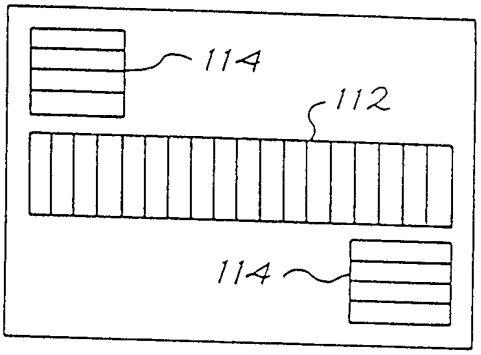


Fig. 27d

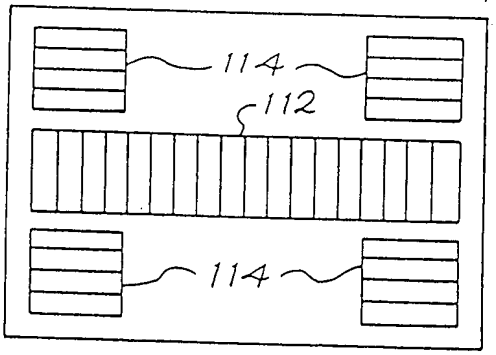


Fig. 27e

Fig. 38

	OLD PORTION OF FRAME				NEW PORTION OF FRAME			
PIXEL No.	0	1	2	3	4	5	6	7
FRAME 1 WEIGHTING FACTOR	1	1	.75	.50	.25	0	0	0
FRAME 2 WEIGHTING FACTOR	0	0	.25	.50	.75	1	1	1

FIG. 27f

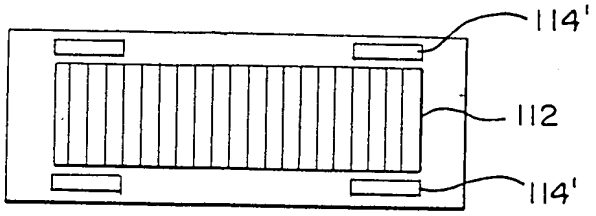


FIG. 27g

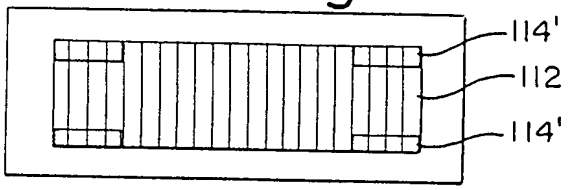
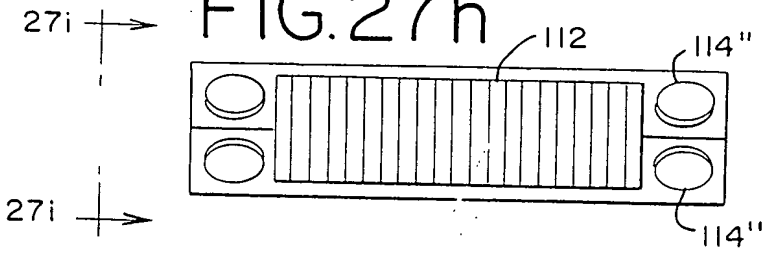


FIG. 27h



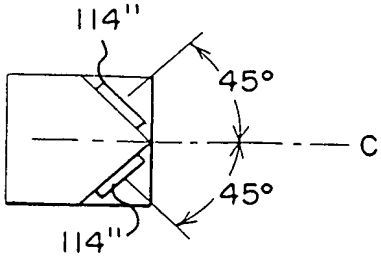
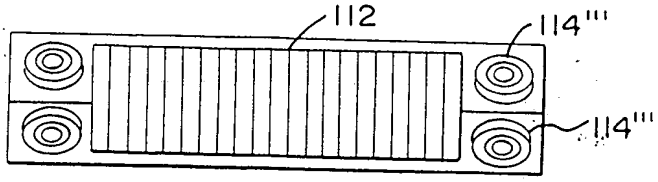


FIG. 27i

FIG. 27j



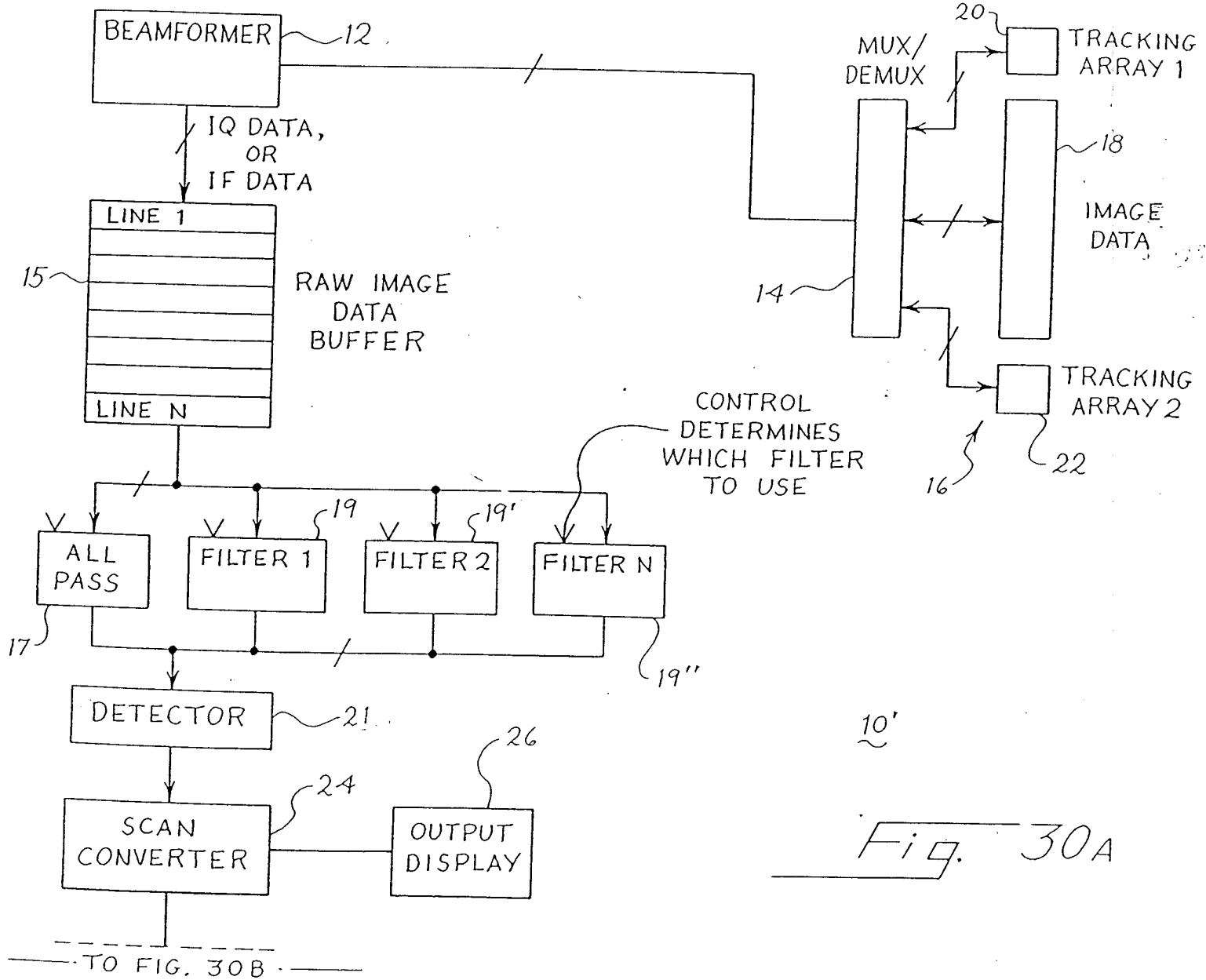

BEAMFORMER
12
IQ DATA,
OR
IF DATA
LINE 1
LINE N
15
RAW IMAGE
DATA
BUFFER
MUX/
DEMUX
20
TRACKING
ARRAY 1
18
IMAGE
DATA
14
TRACKING
ARRAY 2
22
16
CONTROL
DETERMINES
WHICH FILTER
TO USE
ALL
PASS
FILTER 1
FILTER 2
FILTER N
19
19'
19''
17
DETECTOR
21
SCAN
CONVERTER
24
OUTPUT
DISPLAY
26
TO FIG. 30B
10'

Fig. 30A

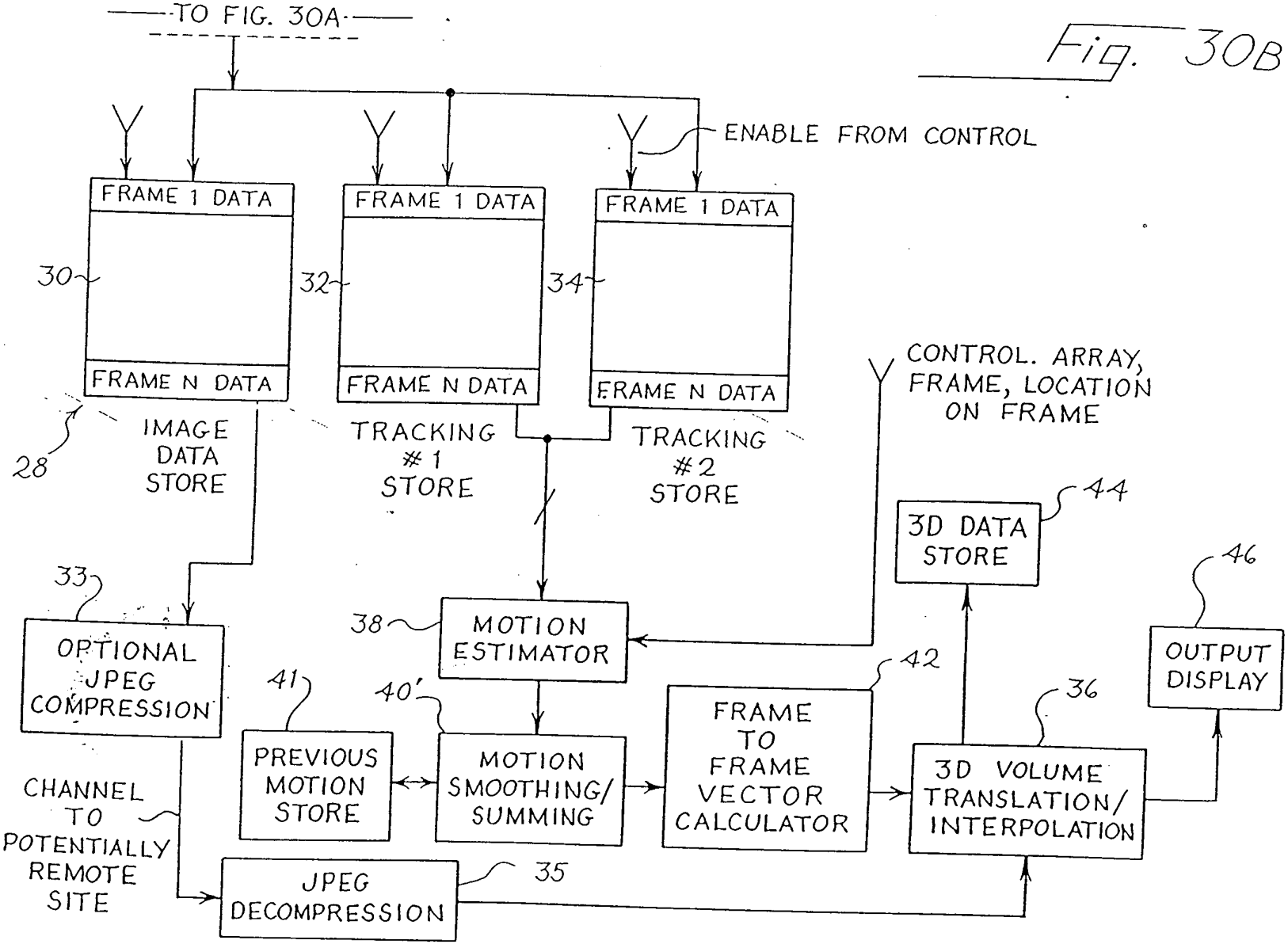

TO FIG. 30A
ENABLE FROM CONTROL
FRAME 1 DATA
FRAME N DATA
30
32
34
28
IMAGE DATA STORE
TRACKING #1 STORE
TRACKING #2 STORE
CONTROL. ARRAY, FRAME, LOCATION ON FRAME
3D DATA STORE
44
46
33
OPTIONAL JPEG COMPRESSION
38
MOTION ESTIMATOR
OUTPUT DISPLAY
41
40'
42
36
PREVIOUS MOTION STORE
MOTION SMOOTHING/ SUMMING
FRAME TO FRAME VECTOR CALCULATOR
3D VOLUME TRANSLATION/ INTERPOLATION
CHANNEL TO POTENTIALLY REMOTE SITE
JPEG DECOMPRESSION
35

Fig. 30B

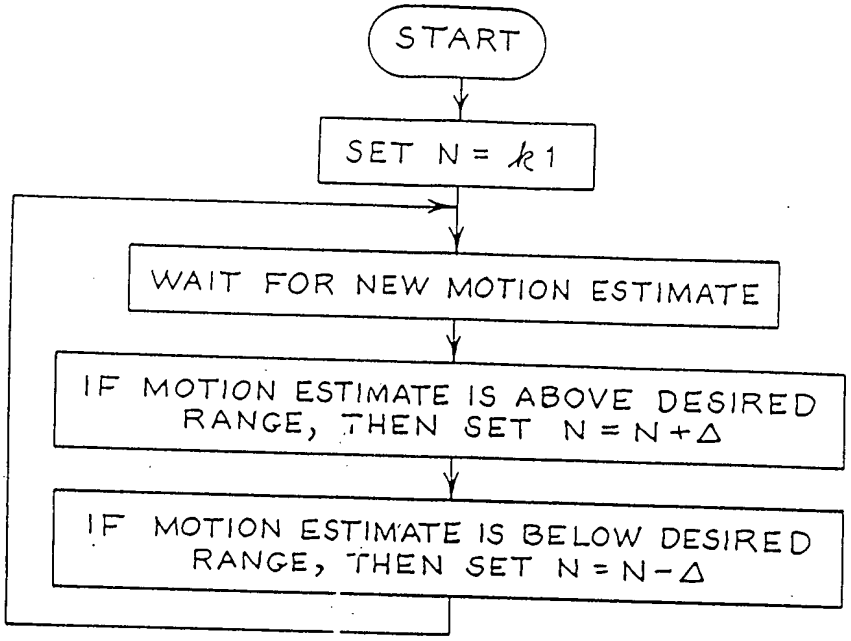

START
SET N = k1
WAIT FOR NEW MOTION ESTIMATE
IF MOTION ESTIMATE IS ABOVE DESIRED RANGE, THEN SET N = N+Δ
IF MOTION ESTIMATE IS BELOW DESIRED RANGE, THEN SET N = N-Δ

Fig. 31

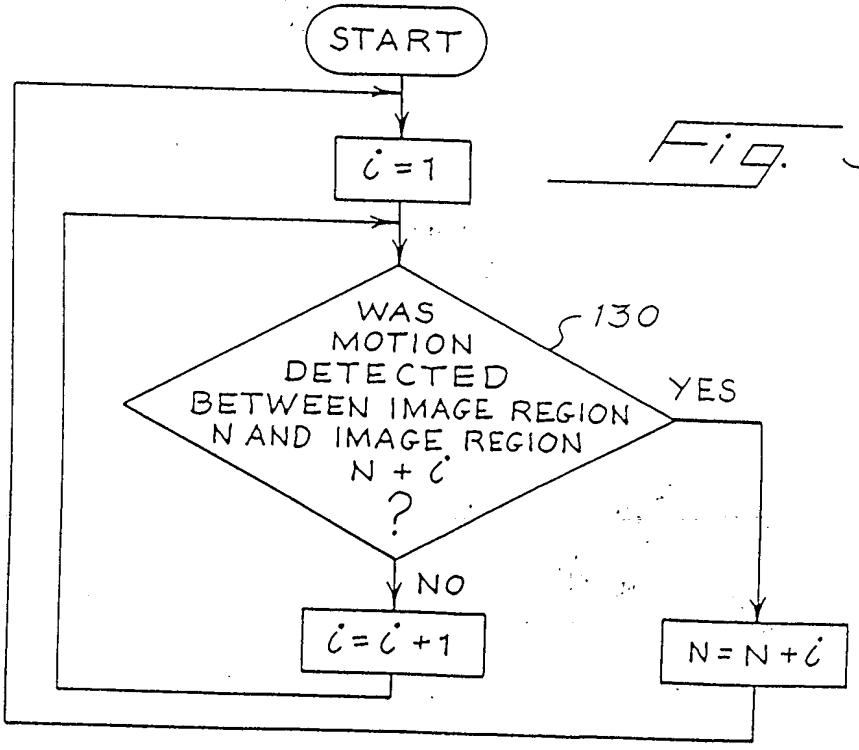

START
i = 1
WAS MOTION DETECTED BETWEEN IMAGE REGION N AND IMAGE REGION N + i ?
130
YES
NO
i = i + 1
N = N + i

Fig. 32

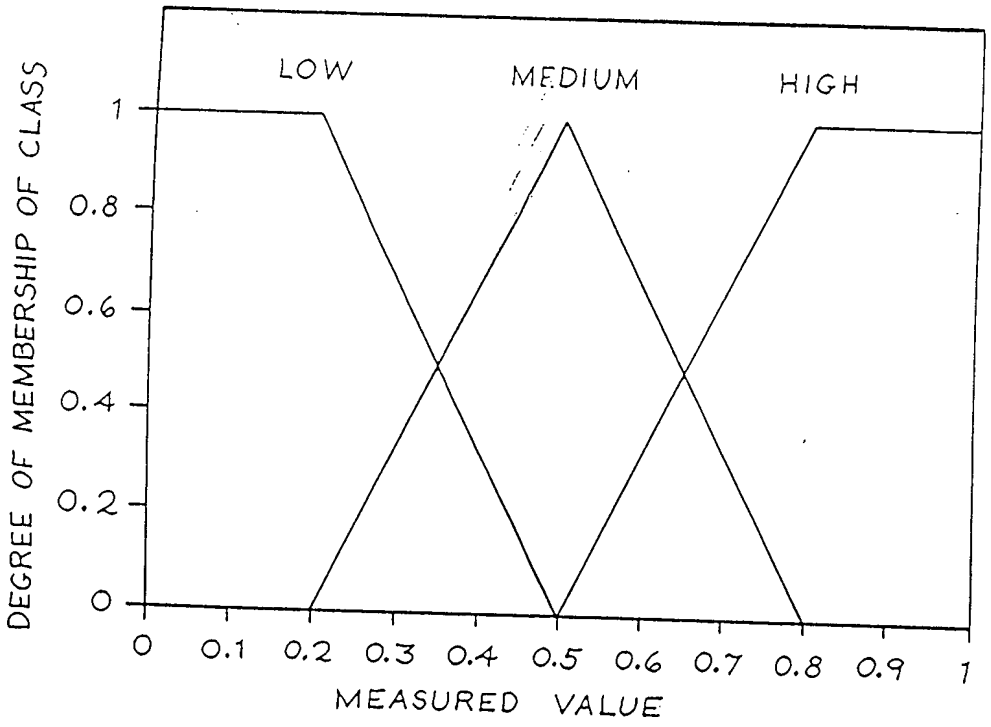

LOW
MEDIUM
HIGH
DEGREE OF MEMBERSHIP OF CLASS
1
0.8
0.6
0.4
0.2
0
0 0.1 0.2 0.3 0.4 0.5 0.6 0.7 0.8 0.9 1
MEASURED VALUE

Fig. 34

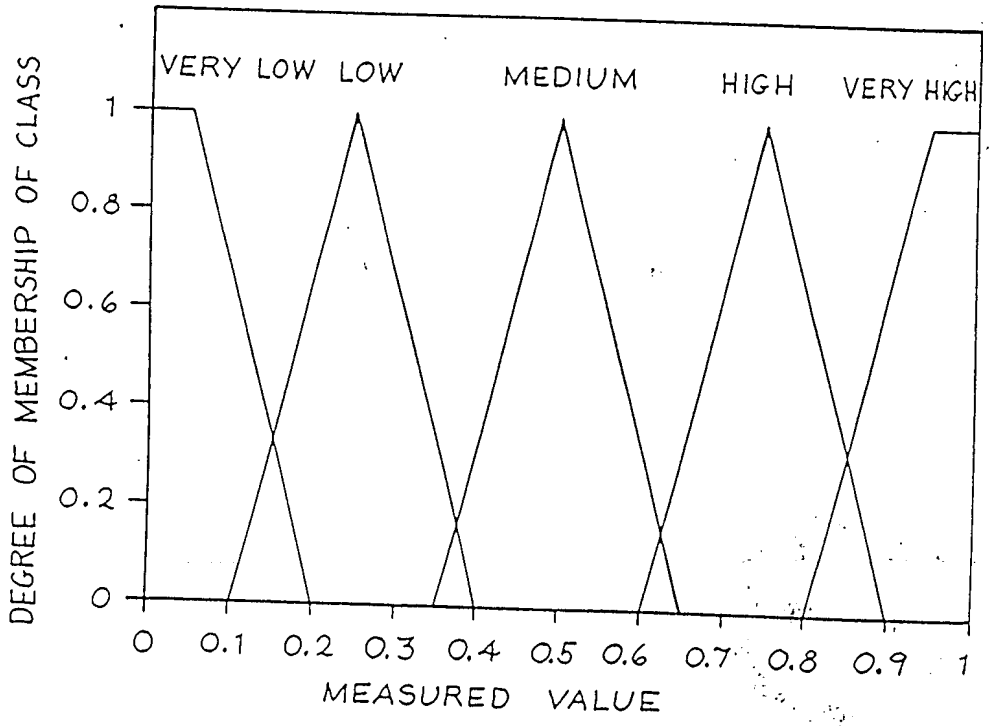

VERY LOW
LOW
MEDIUM
HIGH
VERY HIGH
DEGREE OF MEMBERSHIP OF CLASS
1
0.8
0.6
0.4
0.2
0
0 0.1 0.2 0.3 0.4 0.5 0.6 0.7 0.8 0.9 1
MEASURED VALUE

Fig. 35

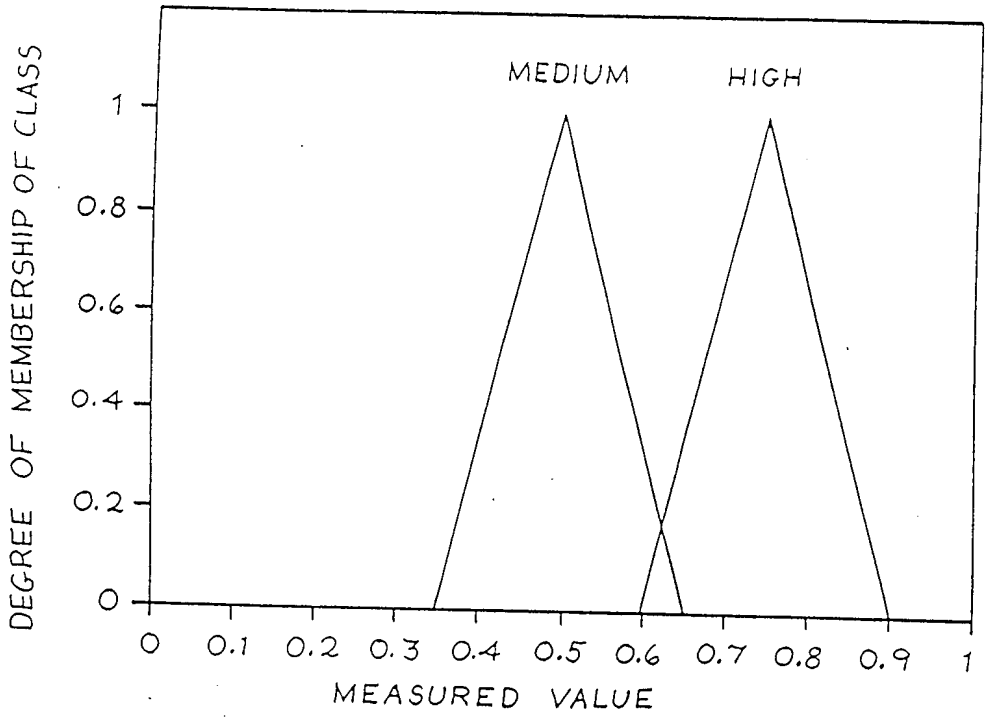

MEDIUM
HIGH
DEGREE OF MEMBERSHIP OF CLASS
1
0.8
0.6
0.4
0.2
0
0 0.1 0.2 0.3 0.4 0.5 0.6 0.7 0.8 0.9 1
MEASURED VALUE

Fig. 36

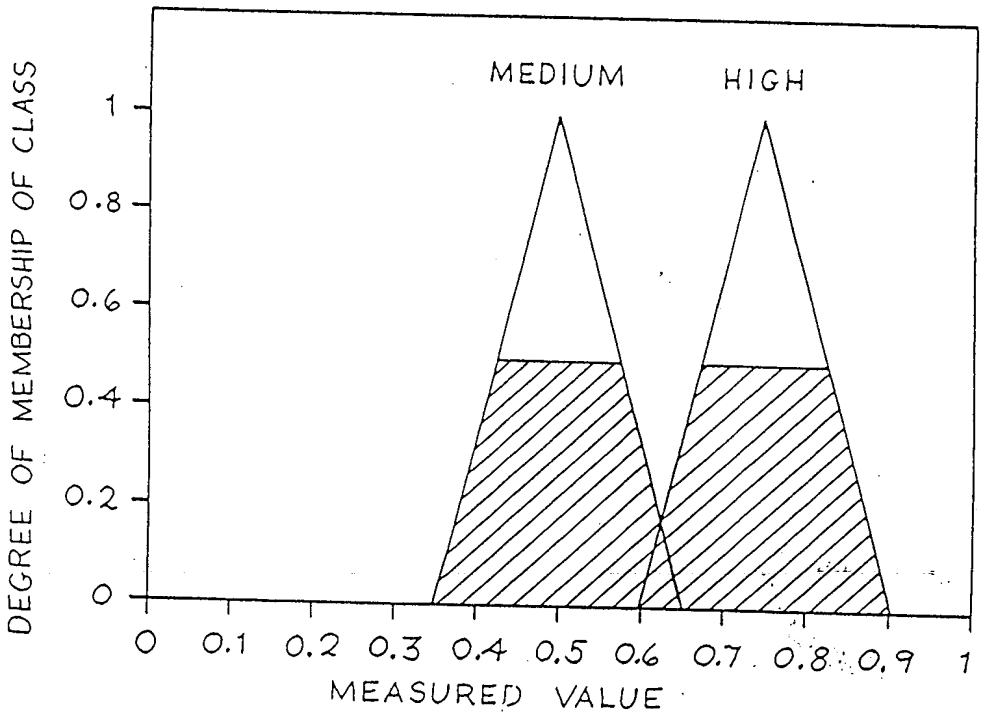

MEDIUM
HIGH
DEGREE OF MEMBERSHIP OF CLASS
1
0.8
0.6
0.4
0.2
0
0 0.1 0.2 0.3 0.4 0.5 0.6 0.7 0.8 0.9 1
MEASURED VALUE

Fig. 37

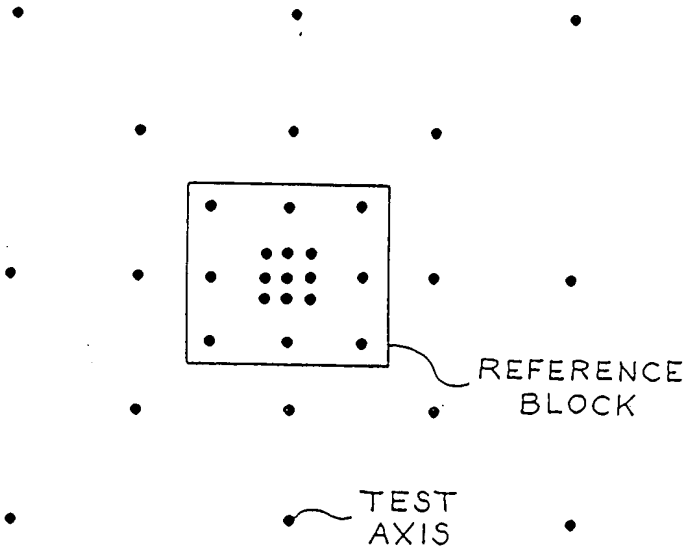

REFERENCE
BLOCK
TEST
AXIS

Fig. 39

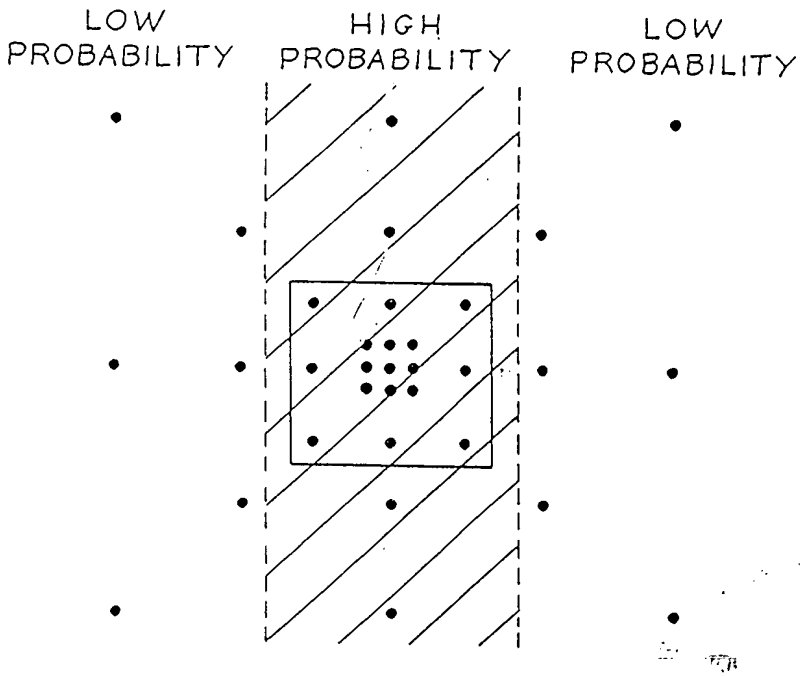

LOW
PROBABILITY
HIGH
PROBABILITY
LOW
PROBABILITY

Fig. 40

FIG.41

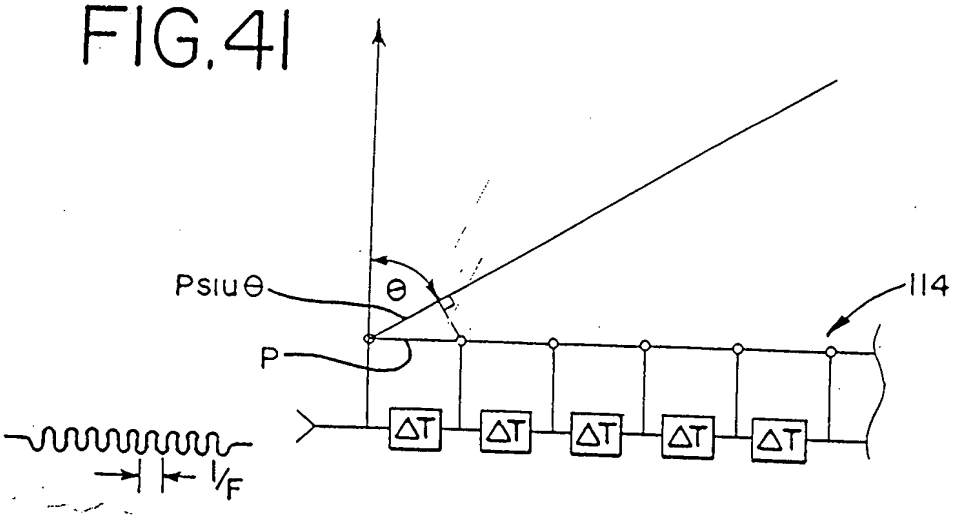


FIG.42

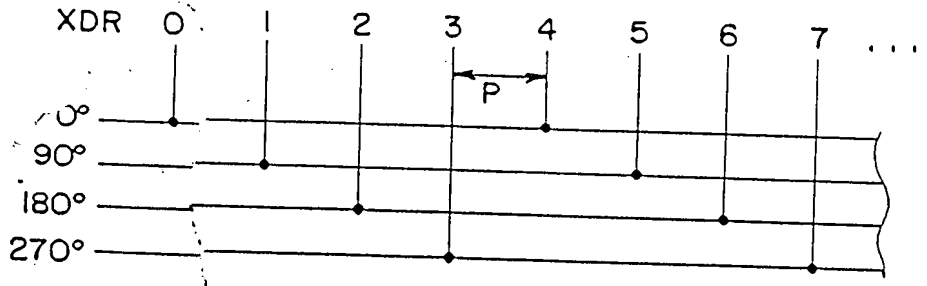
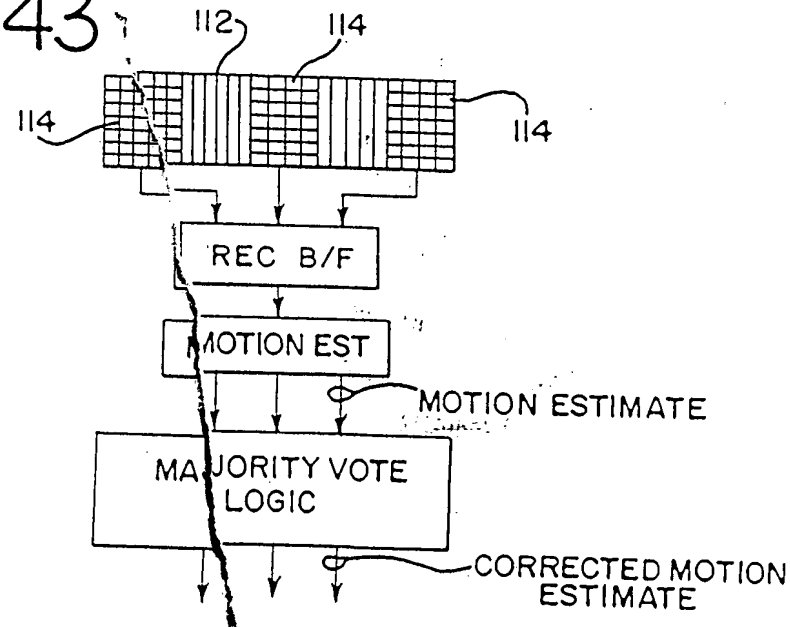



FIG.43